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Patent

UNITED STATES PATENT APPLICATION
FOR
**Network Publication Of Data
Synchronized With Television Broadcasts**

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Network Publication Of Data Synchronized With Television Broadcasts

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Field of the Invention

The invention generally relates to television broadcasting, and more particularly to enhancing television broadcasts with synchronized and asynchronous companion services and data, such as ATVEF data.

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Background

It is desirable to be able to synchronously deliver services or data along with a television broadcast. Towards this end, the Advanced Television Enhancement Forum (ATVEF), resulting from a consortium of broadcast, cable and computer companies, developed an HTML and JavaScript-based format for associating digital content with television broadcasts. The general concept is to synchronize enhancing data, such as game show content, related items for sale, or other arbitrary content presentations with a broadcast, and have the synchronized content presented to a viewer.

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Presently there are two types of ATVEF content. The first, called Type A, comprises embedding a Uniform Resource Locator (URL) within the vertical blank interrupt (VBI) of a conventional television broadcast signal. An ATVEF receiver, such as a Microsoft Web TV device, receives the URL and loads network content referenced by the URL. (Please note that all marks used herein are the property of their respective owners.) A significant limitation of conventional television broadcasts, however, is limited bandwidth provided by the VBI. The second type of ATVEF content, called Type

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B, comprises embedding rich content within a digital broadcast channel. Each digital broadcast channel includes audiovisual data, and a data channel providing 19.2 megabits per second of data transfer for embedded rich content intended to enhance the accompanying audiovisual data.

5 A significant limitation to ATVEF types of content distributions is that dedicated decoding hardware required to receive and decode the ATVEF data. That is, each viewer is required to have a Web TV, Tivoli, or other dedicated hardware that can receive and proves the ATVEF content.

Brief Description Of The Drawings

The features and advantages of the present invention will become apparent from the following detailed description of the present invention in which:

FIG. 1 illustrates a prior art configuration for delivery of ATVEF content.

FIG. 2 illustrates one embodiment of the invention that overcomes the
15 requirement for dedicated ATVEF decoding hardware.

FIG. 3 is a flowchart illustrating one embodiment for leveraging the power of a personal computer to process ATVEF data that is transmitted 300 along with a television broadcast.

FIG. 4 illustrates a suitable computing environment in which certain aspects of
20 the invention may be implemented.

Detailed Description

FIG. 1 illustrates an exemplary prior art configuration for delivery of ATVEF data to a viewer home represented by box **100**. As illustrated, the viewer home **100** has a home network **102**, to which is attached a home computer (PC) **104** and a wireless device **106**, such as an interactive tablet, personal digital assistant (PDA), wireless computer, gaming device, cellular telephone, or other wireless machine. The wireless device may be directly responsible for receiving and processing network content, as would a typical computer. Also within viewer home **100** is a television **108** which receives broadcasts over a communication path **110**, which may include a terrestrial wireless broadcast environment, a wired (e.g., cable) environment, or other broadcast service.

As illustrated, a television broadcaster **112** is a source for a particular broadcast, and an ATVEF broadcaster **114** is responsible for providing ATVEF content in accord with a particular television broadcast. Although the ATVEF and television broadcaster are presented separately, they may be a single entity. To receive the broadcasted ATVEF content, a viewer home **100** is required to have an ATVEF decoder **116** to receive and decode the ATVEF data, e.g., the Microsoft Web TV product, or other decoding device. In addition, a machine, such as the home PC **104**, may be configured with an ATVEF decoder card.

One significant limitation to this exemplary prior art configuration is that requiring an ATVEF decoding device **116** for every television is costly. Another limitation is the restrictive ability to upgrade decoding equipment to keep pace with technological advances. Presently, in order to effect an upgrade to an existing decoder, either a

service call must be made to physically upgrade a decoder, a user must send in the device for an upgrade and deprive themselves of the decoder in the upgrade interim, or decoders must be built with more costly components and designs to allow field upgrades from a remote location, e.g., from the ATVEF broadcaster **114**.

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FIG. 2 illustrates one embodiment for overcoming the requirement for dedicated ATVEF decoding hardware. Note that references to a “home” environment are illustrative only, and that different environments, such as workplaces, educational institutions, etc., are within the scope and intent of the present invention. In addition, it will be appreciated to one skilled in the art that even though this description focuses on ATVEF data, the present invention is generally applicable to other environments in which content is synchronously delivered along with a television broadcast.

In the illustrated embodiment, rather than directly sending ATVEF data directly to a decoder box **116** (FIG. 1) as discussed above, instead ATVEF data is received by a central ATVEF receiving site **200**. The ATVEF receiving site **200** then utilizes converters to transcode received ATVEF data in a format suitable for distribution to a viewer home **100** over a network **106**, e.g., wired or wireless networks such as an intranet, the Internet, etc. In one embodiment, the ATVEF data is distributed as TCP/IP network traffic, however it will be appreciated by the skilled artisan that other protocols may be used, and that over time, as network technologies improve, different protocols may be more optimal for ATVEF data distribution.

Illustrated are exemplary transcoding converters for ATVEF broadcasts. Thus, for example, in one embodiment, there may be a converter **202** for converting ATVEF

data into a streaming media format, e.g., such as one provided by Microsoft Corp., Real Networks, Inc., or other audio and/or visual format.

In one embodiment, there may be a converter **204** for re-distributing ATVEF data over the network **106** to a networked location otherwise unable to receive conventional
5 ATVEF broadcasts. For example, the ATVEF content may be re-distributed over the network **106** to allow offloading of ATVEF processing, e.g., conversions, etc., to machines of the home network **102**.

In one embodiment, there may be a converter **206** for re-distributing ATVEF data by way of a web server. In this embodiment, a web browser within a viewer home **100**
10 (FIG. 1) may be used to contact the web server and display the ATVEF data. For example, a web browser operating on home PC **104** may load and interact with a web page identified by ATVEF data broadcasted along with a game show. In one embodiment, a web browser operates on a wireless handheld device **106**, allowing a television viewer to more conveniently view the ATVEF data along with a television's
15 **108** broadcast. This handheld device may be self-reliant, e.g., able to directly process ATVEF data, or the processing power of the home PC may be utilized to pre-process the ATVEF data and present it to the handheld device for display (see FIG. 3). Such a configuration allows for a simpler, and therefore less costly, handheld device.

In one embodiment, there may be a converter **208** for converting the ATVEF data
20 into some other arbitrary format. It will be appreciated by one skilled in the art that a converter may be implemented to convert the ATVEF data into any desired format for transmission over the network **106**. For example, converters may be implemented to tailor ATVEF content for display over cellular telephones, home appliances, watches, or

other products comprising perceptible output. For devices such as cellular telephones, depending on the nature of the cellular telephone system, a bridge between the network **106** and the cellular switching network may be required. Note that the present invention applies to both two-dimensional broadcast environments, such as conventional television broadcasts, or immersion environments, e.g., large view-field environments such Omnimax, and three dimensional broadcast environments, such as virtual reality environments, stereoscopic displays, and the like.

It will be appreciated that different techniques can be applied to determine which of various available transcoding formats is to be sent to a particular viewer home (see FIG. 3). For example, a viewer home may register preferences with the central site **200**. Alternatively, a viewer home may operate a service, server, or other responding device that the central site may query as to desired reception formats. In one embodiment, when a viewer home supports multiple reception formats, a test is performed to identify a more optimal transmission format. For example, network congestion may cause one format to perform more optimally than another.

FIG. 3 is a flowchart illustrating one embodiment for leveraging the power of a personal computer or other computing device to process ATVEF data that is transmitted **300** along with a television broadcast.

The ATVEF data is received **302** by a central site. For a particular viewer home, the central site determines **304** a desired format for the viewer home. Depending on the desired format, transcoded ATVEF data may be pushed to the viewer home, or made available for pulling by the viewer home in the desired format. For example, if the

desired format is browser based ATVEF receiver, then a web browser may pull content from the central site. In one embodiment, the central site offers a subscription service in which different rates are charged for different transcoding formats. Thus, once available formats are determined **304**, a particular one may be utilized based on viewer home preferences.

The ATVEF data is transcoded **306** into the desired format, and provided **308** to the viewer home for receipt **310** through a network. For example, in a streaming media context, an appropriate streaming media server is configured to provide the transcoded data to a streaming media client of the viewer home.

In the illustrated embodiment, a computing device, such as a home PC **104** (FIG. 1), or other machine, receives **310** the transcoded data. The computing device then converts **312** the transcoded data into a format suitable for presentation **314** by a handheld device, e.g., a PDA, tablet, telephone, wireless handheld device, etc. Conversion is dependent on the capabilities of the handheld device, e.g., display size, color capabilities, input/output capabilities, memory capacity, etc. In one embodiment, capabilities are assumed, or known in advance, such as due to an install process indicating the capabilities.

In another embodiment, a discovery protocol is employed to determine the capabilities of the handheld device. For example, a wireless handheld device may automatically register its capabilities with the home PC when it comes into range of the home PC, or attaches to the home network. The home PC may then appropriately deliver the transcoded ATVEF data. Alternatively, the home PC may interrogate the

handheld device when it comes into range of the home PC, or attaches to the home network.

FIG. 4 and the following discussion are intended to provide a brief, general description of a suitable computing environment in which certain aspects of the illustrated invention may be implemented. For example, an exemplary system for embodying the home PC **104** or wireless device **106** of FIG. 1 includes a machine **400** having system bus **402** for coupling various machine components.

Typically, attached to the bus are processors **404**, a memory **406** (e.g., RAM, ROM), storage devices **408**, a video interface **410**, and input/output interface ports **412**. The machine may also include embedded controllers, Programmable Logic Devices (PLD), Programmable Logic Arrays (PLA), Programmable Array Logic (PAL), Generic Array Logic (GAL), Field-Programmable Gate Arrays (FPGA), Application Specific Integrated Circuits (ASIC), computers, smart cards, or another machine, system, etc.

The system is expected to operate in a networked environment using logical connections to one or more remote machines **414**, **416** through a network interface **418**, modem **420**, or other communication pathway. For example, assuming the system comprises the home PC **104**, then remote machine **414** may be the FIG. 2 central site ATVEF receiver **200**. It will be appreciated that remote machines **414**, **416** may be configured like machine **400**, and therefore include many or all of the elements discussed for machine.

It should also be appreciated that machines **400, 414, 416** may be embodied within a single device, or separate communicatively-coupled components, and may include or be embodied within routers, bridges, peer devices, web servers, etc.

Machines may be interconnected by way of a wired or wireless network **422** including an intranet such as home network **102**, the Internet, local area networks, wide area networks, cellular, cable, laser, satellite, microwave, Blue Tooth, optical, infrared, or other carrier technology.

Memory **406**, storage devices **408**, and associated media, can store data and directives for the machine **400**. The invention may be described by reference to different high-level program modules and/or low-level hardware contexts that may be stored in memory **406** and/or storage devices **408**. Program modules include procedures, functions, programs, components, data structures, and the like, for performing particular tasks or implementing particular abstract data types. One skilled in the art will realize that program modules and low-level hardware contexts can be interchanged with low-level hardware instructions.

Program modules may be implemented within a single machine, or processed in a distributed network environment, and stored in both local and remote memory.

Memory and storage devices include hard-drives, floppy-disks, optical storage, magnetic cassettes, tapes, flash memory cards, memory sticks, digital video disks, biological storage, and the like, as well as wired and wireless transmission environments, over which directives may be delivered in the form of packets, serial data, parallel data, or other suitable transmission format.

Having described and illustrated the principles of the invention with reference to illustrated embodiments, it will be recognized that the illustrated embodiments can be modified in arrangement and detail without departing from such principles.

And, even though the foregoing discussion has focused on particular
5 embodiments, it is understood that other configurations are contemplated. In particular, even though expressions such as “in one embodiment,” “in another embodiment,” or the like are used herein, these phrases are meant to generally reference embodiment possibilities, and are not intended to limit the invention to particular embodiment configurations. As used herein, these terms may reference the same or different
10 embodiments, and unless implicitly or expressly indicated otherwise, embodiments are combinable into other embodiments. Consequently, in view of the wide variety of permutations to the above-described embodiments, the detailed description is intended to be illustrative only, and should not be taken as limiting the scope of the invention.

What is claimed as the invention, therefore, is all such modifications as may
15 come within the scope and spirit of the following claims and equivalents thereto.